to those that are sufficiently humid to permit the development of luxuriant mesophytic forests. GROOM'S paper is most suggestive, and adds considerably to our knowledge concerning the difficult problem of coniferous xerophytism.—HENRY C. COWLES.

Nutrition of the embryo in Labiatae.—BILLINGS[9] has investigated the nutritive mechanism associated with the embryo sac of certain Labiatae, a subject that deserves more attention from morphologists. The ordinary sac which is oval or elliptical in longitudinal section, and which encroaches uniformly upon the surrounding tissues, has come to be regarded as the more or less fixed "type" of angiospermous sac. Among the Sympetalae especially, however, a much more complex nutritive mechanism has begun to be uncovered, including special digestive layers and special absorptive regions of the sac, the latter usually taking the expression of tubular haustorial extensions. BILLINGS investigated 15 species of Labiatae, representing 14 of the most representative genera. The results were uniform enough and differed enough from other sympetalous groups investigated to indicate that such structures may be of taxonomic and even of phylogenetic value. For example, the Scrophulariaceae previously described usually have a well developed digestive layer ("tapetum"), in addition to haustorial extensions of various kinds; but the Labiatae lack the special digestive layer. There are three features common to the species studied, and possibly to the whole family, to which the author calls attention: the micropylar haustorium (more or less extensively developed), the much-elongated suspensor, and the antipodal canal or process. *Salvia* is an exception to this statement, for it has a short suspensor and no micropylar haustorium; and the two species investigated "are unique in having two haustorial outgrowths, one coenocytic and one composed of ordinary endosperm tissue" (these haustoria are in addition to the well developed antipodal canal). The author thinks that such variations from the general conditions as are shown by *Salvia* "suggest a taxonomic rearrangement."—J. M. C.

Correlation in oats.—WALDRON[10] has compared the height of culm, length of head, number of grains per head, and average weight of grains in a variety of oats growing at Dickinson, North Dakota. The examination of 1000 plants discovered decided negative correlations (-0.595 ± 0.013, -0.511 ± 0.015, and -0.404 ± 0.017) between the weight of grains and number of grains per head, weight of grains and length of head, and between weight of grains and length of culm. He reaches the conclusion that in selecting the heaviest grains in this variety, the breeder selects plants somewhat below the

[9] BILLINGS, F. H., The nutrition of the embryo sac and embryo in certain Labiatae. Kansas Univ. Bull. 5:67–83. *pls. 11–14.* 1909.

[10] WALDRON, L. R., A suggestion regarding heavy and light seed-grain. Amer. Nat. 44:48–56. 1910.

average height, with shorter heads and fewer grains, thus emphasizing the importance of selecting the superior plants instead of the superior individual grains. As this variety of oats was undoubtedly a mixture of several distinct biotypes, it does not follow that the same mathematical results would be found in other varieties composed of different mixtures. The variety with which WALDRON worked may have contained a short-headed, short-culmed, heavy-grained biotype. In some other mixture the heavy-grained biotype might have longer culms, longer heads, and more numerous grains, and it would then give a positive correlation where WALDRON found a negative correlation, but this does not lessen the importance of the conclusion reached that the individual plant and not the individual grain is the proper unit of selection.—GEO. H. SHULL.

Anatomy of the seedling of Trapa.—A short paper by QUEVA[11] on the curious seedling of *Trapa natans* recalls the case of "caulicle" vs. "radicle," the question of the importance of the root as a primarily essential part of a seed plant. The author confirms the observations of previous investigators concerning the marked inequality of the cotyledons, the negative geotropism of the caulicle (which he prefers to call the hypocotyledonary axis), and the presence of internal phoem in the stem and leaves. His own investigation has resulted in the discovery of this internal phloem in the hypocotyledonary axis and in the petiole of the cotyledon. Although he finds in the very tip of the hypocotyledonary axis a vascular condition which is peculiarly root-like (two xylem points alternating with two small groups of phloem), yet he thinks it is not root, because (1) there is no rotation of the strands in successive levels from the tip of the organ to the cotyledonary node; (2) the xylem points are too near the periphery of the cylinder to look like root poles; and (3) the whole organ is covered by epidermis, except at the spot where the suspensor was attached. The growth of the caulicle, or hypocotyledonary axis, is limited; the roots strike out from its side, their vascular strands being inserted on certain metaxylem elements discernible in cross-section on one side of the vascular cylinder.—SISTER HELEN ANGELA.

Sporophylls of Selaginella.—SYKES and STILES[12] have made a very interesting study of the sporophylls of *Selaginella*, finding an amount of variation and a degree of complexity that have not attracted attention heretofore. A few of the more representative species are described and the different forms of the sporophyll are pointed out as "special adaptations for the secure protection of the sporangia." In many sporophylls there is a well developed air cavity in the base, and the authors suggest "that they recall the mucilage

---

[11] QUEVA, C., Observations anatomiques sur le *Trapa natans* L. Compt. Rend. Assoc. Fran. Av. Sci. 1909. Congrès de Lille, pp. 512–517. *figs. 2*. 1909.

[12] SYKES, M. G., and STILES, W., The cone of the genus *Selaginella*. Annals of Botany **24**:523–536. *pl. 41*. 1910.